

SPECIFICATION AMENDMENTS

Pages 5-6, Bridging Paragraph:

Preferably, one of the external additives is ~~a large-~~
~~sized an~~ external additive having a number average primary
particle diameter larger than that of the small-sized
external additive, and of 15 to 70 nm.

Page 7, third paragraph:

Preferably, one of the external additives is ~~a large-~~
~~sized an~~ external additive having a number average primary
particle diameter larger than that of the small-sized
external additive, and of 15 to 70 nm.

Page 8, third Paragraph:

Preferably, one of the external additives is ~~a large-~~
~~sized an~~ external additive having a number average primary
particle diameter larger than that of the small-sized
external additive, and of 15 to 70 nm.

Page 17, third Paragraph:

To uniformly control the coefficient of variation of shape factor and the shape factor itself of the toner without lot-to-lot variations, an appropriate time point for terminating the salting-out/fusing step and aging treatment may be determined while monitoring the characteristics of toner particles (~~colorant~~ colored particles) being formed.

Page 20, third Paragraph:

It is preferred that the toner according to the present invention is formed by adding a small-sized external additive (external additive having a small particle diameter), and more particularly by adding a small-sized external additive and an external additive having a large particle diameter (~~hereinafter also referred to as a "large-sized external additive"~~), with these external additives being mixed by a multiple-step mixing method in which the small-sized external additive and the large-sized external additive having a large particle diameter are added to be mixed therein, in the mentioned order.

Pages 21-22, Bridging Paragraph - Pages 22-23, Bridging Paragraph:

Although in the toner according to the present invention, it is preferred that the external additives are caused to uniformly adhere to surfaces of ~~cicolorant~~ colored particles, when a plurality of particles having different diameters (hereinafter also referred to as "multi-diameter particles") are used in combination as external additives, different stresses are applied to the external additives due to different fluidities of the above particles, which make it impossible to cause the multi-diameter particles forming the external additives to uniformly adhere to the surfaces of the toner particles, even if they are mixed under predetermined conditions. Therefore, it is preferred to employ the multiple-step mixing method in which the small-sized external additive is added to the toner to be mixed therein, and then the large-sized external additive is added to the toner, to be mixed therein.

More specifically, since the small-sized external additive exhibits a high cohesiveness between particles forming the same, it is necessary to loosen the aggregation of the particles to some degree, whereas when the large-sized external additive and the small sized external additive are simultaneously added to the toner for mixing,

particles of the small-sized external additive adhere to surfaces of particles of the large-sized external additive, resulting in the degraded capability of the large-sized external additive for imparting the spacing effect.

Therefore, it is considered that by first adding the small-sized external additive for mixing, to loosen the aggregation to thereby increase fluidity, and then adding the large-sized external additive having a lower cohesiveness than the small-sized external additive for mixing, it is possible to cause the external additives comprised of the small-sized external additive and the large-sized external additive to uniformly adhere to the surfaces of the ~~colorant~~ colored particles.

It is preferred that the amount of the small-sized external additive added to the toner is 0.1 to 5.0 mass % with respect to the ~~colorant~~ colored particles.

Preferably, the amount of the large-sized external additive added to the toner is 0.1 to 5.0 mass % with respect to the ~~colorant~~ colored particles.

Paragraph:

It should be noted that a state where the surface coverage exceeds 100 % indicates a state where the external additive has adhered to a whole periphery of a ~~eolorant~~ colored particle, and at the same time the external additive exists in the form of multiple layers.

The surface coverage is for evaluating a state of presence of the external additive adhering to a surface of a ~~eolorant~~ colored particle. The surface coverage is obtained by slicing a sample formed by enclosing toner particles having an external additive added thereto with an epoxy resin, to a thickness of 0.2 μm , observing the obtained slice using a transmission electron microscope to thereby measure a length of periphery of a portion of the ~~eolorant~~ colored particle where the external additive adheres, and calculating a ratio of a value of the measured length to a length of the whole periphery of the portion of the ~~eolorant~~ colored particles.

Page 37, Sixth Paragraph - Pages 37-38, Bridging Paragraph:

To add an external additive to ~~colorant~~ colored particles, there is employed a method of adding the external additive to a system charged with the ~~colorant~~ colored particles, and mixing the ~~colorant~~ colored particles and the external additive with stirring.

To mix the ~~colorant~~ colored particles and the external additive with stirring, a mechanical rotation processing apparatus is preferably used. More specifically, a rotation-type mixer, such as the Henschel mixer, is suitably used.

It is preferable that an addition process by such an apparatus is carried out at a stirring speed which causes distal ends of stirring blades disposed in the apparatus to rotate at a speed (peripheral speed) of 30 to 80 m/sec, more preferably 35 to 60 m/sec. This is because when the rotational speed is too high, the mixing-with-stirring process accelerates burial of the external additive into the ~~colorant~~ colored particles, resulting in the increased adhesive stress of a toner obtained.

Pages 85-86, Bridging Paragraph:

[Preparation Example K1 of Colorant Colored Particles]

A reaction vessel (four-neck flask) having a capacity of 5 liters and equipped with a temperature sensor, a cooling pipe, a nitrogen-introducing device, a stirring device (having two stirring blades with a crossing angle of 20 degrees), and a shape-monitoring device was charged with 1250 g of the Latex (1) (in terms of solid content), 2000 ml of deionized water, and a whole amount of the colorant dispersion (1). After the internal temperature was adjusted to 25°C, 5 mol/liter of sodium hydroxide solution was added to the dispersion mixture to adjust the pH to 10.0. Then, to the resulting liquid dispersion mixture, a solution prepared by dissolving 52.6 g of magnesium chloride hexahydrate in 72 ml of deionized water was added with stirring at 25°C over 10 minutes. The mixture was allowed to stand for 3 minutes, and the temperature of the system started to be raised up to 95°C over 5 minutes (temperature-raising speed of 14°C/min).

Page 86, Second Paragraph - Page 93, First Paragraph:

The produced particles were filtered, repeatedly washed by deionized water, subjected to classification in liquid by a centrifugal machine, and thereafter dried using a flash jet drier, whereby ~~colorant~~ colored particles (hereinafter referred to as "the ~~colorant~~ colored particles (K1)") with a moisture content of 1.0 % were obtained.

Characteristics of the obtained ~~colorant~~ colored particles (K1) were checked. The results of the check are shown in Table 2 and Table 3.

[Preparation Examples K2 to K4 of ~~Colorant~~ Colored Particles]

~~Colorant~~ Colored particles (hereinafter also referred to as "the ~~colorant~~ colored particles (K2) to (K4)") were obtained in the same manner as in Preparation Example K1 except that growth of particles was stopped when the volume average particle diameter became equal to a corresponding size shown in Table 2, and the stirring rotation rate, liquid temperature, and heating-with-stirring time period for the aging treatment were set to conditions shown in Table 1.

Characteristics of the obtained ~~colorant~~ colored particles (K2) to (K4) were checked. The results of the check are shown in Table 2 and Table 3.

[Preparation Examples Y1 to Y4 of ~~Colorant~~ Colored Particles]

~~Colorant~~ Colored particles (hereinafter also referred to as "the ~~colorant~~ colored particles (Y1) to (Y4)") were obtained in the same manner as in Preparation Example K1 except that a whole amount of the colorant dispersion (2) was used in place of the whole amount of the colorant dispersion (1), the growth of particles was stopped when the volume average particle diameter thereof became equal to a corresponding size shown in Table 2, and the stirring rotation rate, liquid temperature, and heating-with-stirring time period for the aging treatment were set to conditions shown in Table 1.

Characteristics of the obtained ~~colorant~~ colored particles (Y1) to (Y4) were checked. The results of the check are shown in Table 2 and Table 3.

[Preparation Examples M1 to M4 of Colorant Colored
Particles]

Colorant Colored particles (hereinafter also referred to as "the colorant colored particles (M1) to (M4)") were obtained in the same manner as in Preparation Example K1 except that a whole amount of the colorant dispersion (3) were used in place of the whole amount of the colorant dispersion (1), the growth of particles was stopped when the volume average particle diameter thereof became equal to a corresponding size shown in Table 2, and the stirring rotation rate, liquid temperature, and heating-with-stirring time period for the aging treatment were set to conditions shown in Table 1.

Characteristics of the obtained colorant colored particles (M1) to (M4) were checked. The results of the check are shown in Table 2 and Table 3.

[Preparation Examples C1 to C4 of Colorant Colored
Particles]

Colorant Colored particles (hereinafter also referred to as "the colorant colored particles (C1) to (C4)") were obtained in the same manner as in Preparation Example K1 except that a whole amount of the colorant dispersion (4) was used in place of the whole amount of the colorant dispersion (1), the growth of particles was stopped when the volume average particle diameter thereof became equal to a corresponding size shown in Table 2, and the stirring rotation rate, liquid temperature, and heating-with-stirring time period for the aging treatment were set to conditions shown in Table 1.

Characteristics of the obtained colorant colored particles (C1) to (C4) were checked. The results of the check are shown in Table 2 and Table 3.

Table 1

COLORED PARTICLES	STIRRING ROTATION RATE (rpm)	LIQUID TEMPERATURE (°C)	STIRRING TIME UNDER HEATING (h)
K1	120	90	8
K2	140	90	8
K3	150	88	6
K4	120	95	10
Y1	120	90	8
Y2	140	90	8
Y3	150	88	6
Y4	120	95	10
M1	120	90	8
M2	140	90	8
M3	150	88	6
M4	120	95	10
C1	120	90	8
C2	140	90	8
C3	150	88	6
C4	120	95	10

[Preparation Example K5 of ~~Celorant~~ Colored Particles:

Preparation Example of Comparative ~~Celorant~~ Colored particles]

Raw materials of a toner consisting of 100 kg of styrene-n-butylacrylate copolymer resin, 10 kg of carbon black "Mogul L" (available from Cabot Corporation), and 4 kg of polypropylene were preliminarily mixed by the Henschel mixer, and then melt-kneaded by a twin-screw extruder. The melt-kneaded mixture was roughly pulverized by a hammer mill, and pulverized by a jet pulverizing machine. The obtained powder was repeatedly subjected to classification using a wind classifier until the powder in target particle diameter distribution was produced. Thus, ~~Celorant~~ Colored particles (hereinafter referred to as "the ~~Celorant~~ Colored particles (K5)") having a volume average particle diameter shown in Table 2 were obtained.

[Preparation Example Y5 of ~~Celorant~~ Colored particles:

Preparation Example of Comparative ~~Celorant~~ Colored particles]

~~Celorant~~ Colored particles (hereinafter referred to as "the ~~Celorant~~ Colored particles (Y5)") having a volume average particle diameter shown in Table 2 was obtained in the same manner as in Preparation Example K5 except that 10

kg of pigment "C.I. pigment yellow 74" was used in place of 10 kg of carbon black.

[Preparation Example M5 of Celerant Colored particles:
Preparation Example of Comparative Celerant Colored particles]

Celerant Colored particles (hereinafter referred to as "the celerant colored particles (M5)") having a volume average particle diameter shown in Table 2 were obtained in the same manner as in Preparation Example K5 except that 10 g of quinacridone magenta pigment "C.I. pigment red 122" was used in place of 10 kg of carbon black.

[Preparation Example C5 of Celerant Colored particles:
Preparation Example of Comparative Celerant Colored particles]

Celerant Colored particles (hereinafter referred to as "the celerant colored particles (C5)") having a volume average particle diameter shown in Table 2 were obtained in the same manner as in Preparation Example K5 except that 10 g of phthalocyanine cyan pigment "C.I. pigment blue 15:3" was used in place of 10 kg of carbon black.

Table 2

COLORED PARTICLE NUMBER	ARITHMETIC MEAN VALUE OF SHAPE FACTOR	COEFFICIENT OF VARIATION OF SHAPE FACTOR	RATIO OF ROUNDED COLORED PARTICLES	RATIO OF COLORED PARTICLES HAVING PREDETERMINED PARTICLE DIAMETER	VOLUME AVERAGE PARTICLE DIAMETER
K1	1.30	9 %	91 NUMBER %	7.6 VOLUME %	6.5 μm
K2	1.40	12 %	88 NUMBER %	6.1 VOLUME %	6.6 μm
K3	1.45	15 %	83 NUMBER %	9.1 VOLUME %	6.6 μm
K4	1.56	17 %	81 NUMBER %	9.6 VOLUME %	6.6 μm
K5	1.65	22 %	42 NUMBER %	11.8 VOLUME %	6.5 μm
Y1	1.32	10 %	92 NUMBER %	7.6 VOLUME %	6.5 μm
Y2	1.40	14 %	87 NUMBER %	6.3 VOLUME %	6.6 μm
Y3	1.45	15 %	83 NUMBER %	9.1 VOLUME %	6.6 μm
Y4	1.57	18 %	80 NUMBER %	9.7 VOLUME %	6.6 μm
Y5	1.64	24 %	40 NUMBER %	11.8 VOLUME %	6.5 μm
M1	1.31	9 %	94 NUMBER %	7.3 VOLUME %	6.5 μm
M2	1.42	13 %	88 NUMBER %	6.1 VOLUME %	6.6 μm
M3	1.45	15 %	83 NUMBER %	9.1 VOLUME %	6.6 μm
M4	1.55	18 %	80 NUMBER %	9.7 VOLUME %	6.6 μm
M5	1.63	23 %	41 NUMBER %	12.8 VOLUME %	6.5 μm
C1	1.31	9 %	91 NUMBER %	7.3 VOLUME %	6.5 μm
C2	1.42	13 %	82 NUMBER %	6.5 VOLUME %	6.6 μm
C3	1.45	15 %	83 NUMBER %	9.1 VOLUME %	6.6 μm
C4	1.58	18 %	80 NUMBER %	9.9 VOLUME %	6.6 μm
C5	1.65	22 %	42 NUMBER %	13.8 VOLUME %	6.5 μm

In Table 2, "ratio of rounded ~~colorant~~ colored particles" indicates a ratio of ~~colorant~~ colored particles having a volume average particle diameter in a range of 2.5 μm or less.

Page 96, First Paragraph:

Toner particles were obtained by adding external additives to the ~~colorant~~ colored particles and comparative ~~colorant~~ colored particles according to prescriptions shown in Table 3 to Table 6, referred to hereinafter.